

City of Riverside

**WASTEWATER COLLECTION AND TREATMENT  
FACILITIES INTEGRATED MASTER PLAN**

**VOLUME 4: WASTEWATER TREATMENT SYSTEM  
CHAPTER 11: PLANT UTILITIES  
AND SUPPORT FACILITIES**

**FINAL**

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**WASTEWATER COLLECTION AND TREATMENT  
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**VOLUME 4: WASTEWATER TREATMENT SYSTEM  
CHAPTER 11: PLANT UTILITIES AND SUPPORT FACILITIES**

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## PLANT UTILITIES AND SUPPORT FACILITIES

### 11.1 PURPOSE

The purpose of this chapter is to identify existing plant utilities and support facilities at the Regional Water Quality Control Plant (RWQCP) and, if required, recommend new systems.

### 11.2 CONCLUSIONS AND RECOMMENDATIONS

- The existing potable water system can provide adequate pressure; therefore, no change is needed for the existing piping. New piping will be added as necessary as future expansions are completed.
- Utility water is pumped from Pump Station No. 21 at Chlorine Contact Basin (CCB) No. 1. The utility water system, which includes the pump station and distribution piping, is not adequate. Post, Buckley, Schuh & Jernigan, Inc. (PBS&J) has designed an upgrade to the distribution piping and is currently designing a new pump station, which will be located in CCB No. 2. The new pump station will produce water that meets the Title 22 450 concentration and Contact Time (CT) requirement. In addition to the change that PBS&J is designing, upsizing and looping of the distribution piping in the vicinity of CCB No. 2 will be necessary to accommodate the new pump station location.
- The natural gas system includes low-pressure and high-pressure lines. No change is needed for the existing natural gas system. New piping will be connected to the existing lines as necessary as future expansions are completed.
- There is not a High-Pressure Air (HPA) piping system throughout the RWQCP. There are several small systems in individual process areas. New systems will be installed for new facilities as necessary as future expansions are completed.
- The communication system includes a phone system, plant radio system, and public address system. The public address system is old and should be upgraded.
- Based on *Interim Voluntary Security Guidance for Wastewater/Stormwater Utilities*, published by the Water Environment Federation, the site security level should be evaluated for access control, cyber security, monitoring for flammable/toxic substances, and backup power.
- The existing storm drain system drains to a pump station and is pumped to the Plant 1 aeration basins. In the future, an option to pump upstream of primaries will be added.
- A new maintenance building will be located south of the existing maintenance building. Additional parking space will be added east of the existing parking lot.

- New buildings in excess of 5,000 square feet will meet a minimum of the Leadership in Energy and Environmental Design (LEED) standard.
- The flood protection levee may have to be raised. The total project cost will be approximately \$52 million (August 2006 dollars).

### 11.3 POTABLE WATER

Figure 11.1 shows the piping layout for the major lines in the existing potable water system. Water is supplied by the City of Riverside (City) Public Utilities Department. City water enters the RWQCP from a 12-inch diameter pipe located in Acorn Street. Because the RWQCP potable water system is looped, it has adequate pressure. No changes are needed for the existing system. Future expansions will include new piping as necessary as future expansions are completed.

### 11.4 UTILITY WATER

The RWQCP utility water system layout is presented in Figure 11.2.

Table 11.1 presents anticipated 2025 on-site utility water uses. Utility water is distributed from Pump Station No. 21 at CCB No.1, except for the water cannon uses. The water cannons supply utility water through a separate booster pump. Utility water is also pumped from Pump Station No. 21 for off-site recycled water uses. These uses are described in Volume 7 – Reclamation and Reuse, of the Integrated Master Plan.

<b>Table 11.1 Future On-Site Utility Water Demands Wastewater Collection and Treatment Facilities Integrated Master Plan City of Riverside</b>	
<b>On-Site Utility Water Application</b>	<b>Maximum Hour Usage<sup>(1)</sup> (gpm)</b>
Belt Filter Press Wash Water	350
Pump Seal Water	75
Alumer Dilution	5
Chlorine Injectors	50
Scum Sprays	50
Wash Down Hydrants (1-inch) <sup>(2)</sup>	40
Wash Down Hydrants (3-inch) <sup>(2)</sup>	100
Water Cannon <sup>(2)(3)</sup>	2,000
Power Plant <sup>(4)</sup>	560



<b>Table 11.1      Future On-Site Utility Water Demands</b> <b>Wastewater Collection and Treatment Facilities Integrated Master Plan</b> <b>City of Riverside</b>	
<b>On-Site Utility Water Application</b>	<b>Maximum Hour Usage<sup>(1)</sup> (gpm)</b>
Miscellaneous <sup>(5)</sup>	200
Future Gravity Belt Thickeners Wash Water	1,320
<b>TOTAL DEMAND</b>	<b>4,750</b>
<b>Notes:</b> (1) Data supplied by the City based on uses through 2025. (2) Intermittent demand. (3) Used for washdown of the tertiary influent equalization basins. (4) Constant demand for industrial process. (5) Includes on-site plant irrigation and general wash down water.	

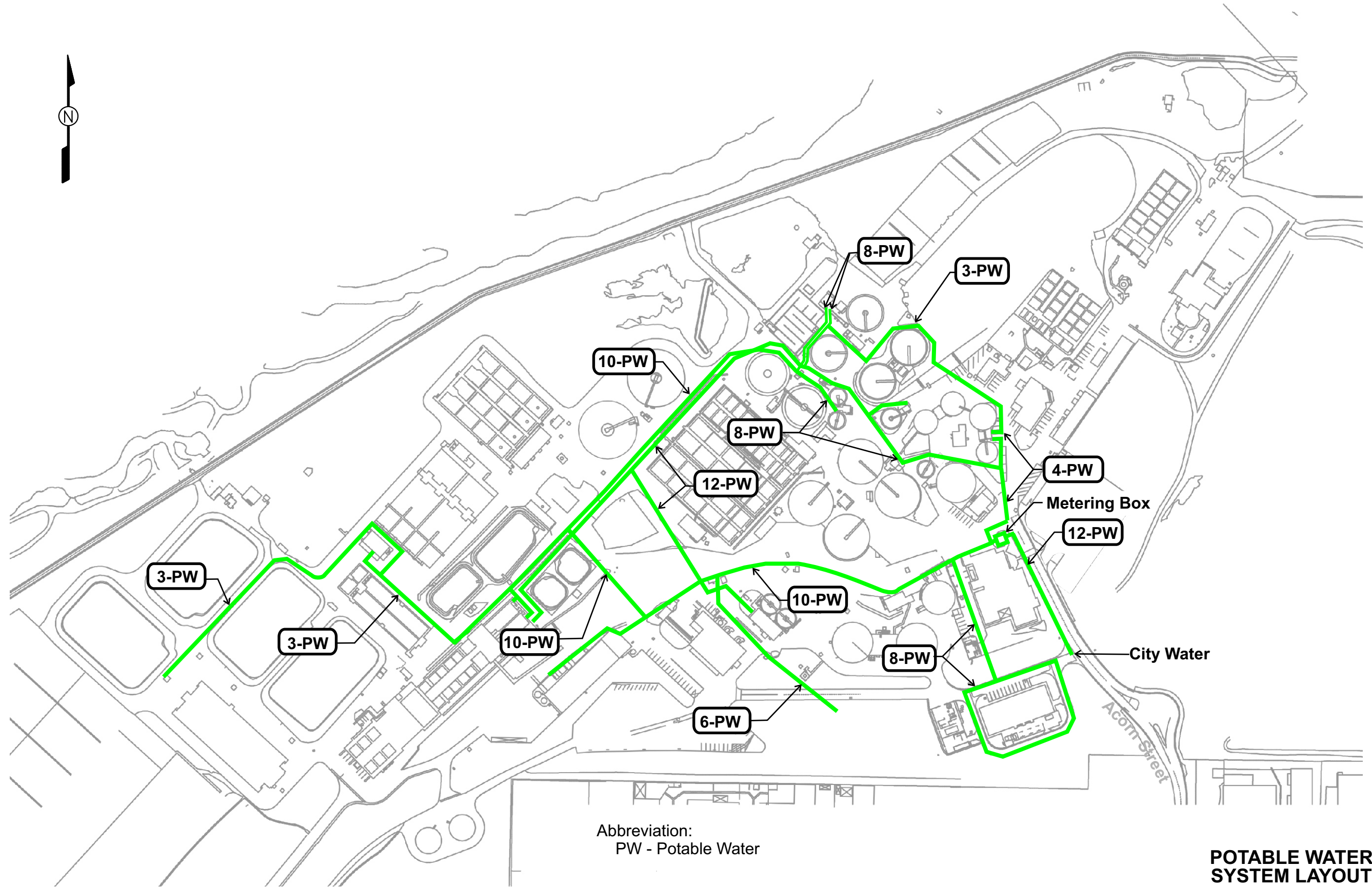
The utility water system is not adequate. There are problems with leakage in the distribution system piping. In addition, some of the lines are abandoned because of inoperable or undocumented valves. In the *Upgrade of Impure Water Piping System* designed by PBS&J, new piping will be provided for higher reliability for on-site utility water uses. Also, the pumps in Pump Station No. 21 have passed their useful life, and the water that is pumped from the pump station does not meet the Title 22 450 CT requirements. PBS&J has designed an upgrade to the distribution piping and is currently designing a new pump station, which will be located in CCB No. 2. The new pump station will produce water that meets the Title 22 450 CT requirement. In addition to the change that PBS&J is designing, upsizing and looping of the distribution piping in the vicinity of CCB No. 2 will be necessary to accommodate the new pump station location.

## 11.5 NATURAL GAS

There is a high-pressure natural gas service for the cogeneration facility that enters the site on Acorn Street. There is another natural gas service for low-pressure uses. The meter for this service is at the west corner of the parking lot. The major pipes from the service entrances to the points of use are shown on Figure 11.3. On-site gas uses include:

- Space heaters.
- Water heaters.
- Boilers.
- Cogeneration facility.

The existing system is adequate to supply gas for the existing RWQCP uses. New piping for future facilities will be connected to the existing system as necessary.

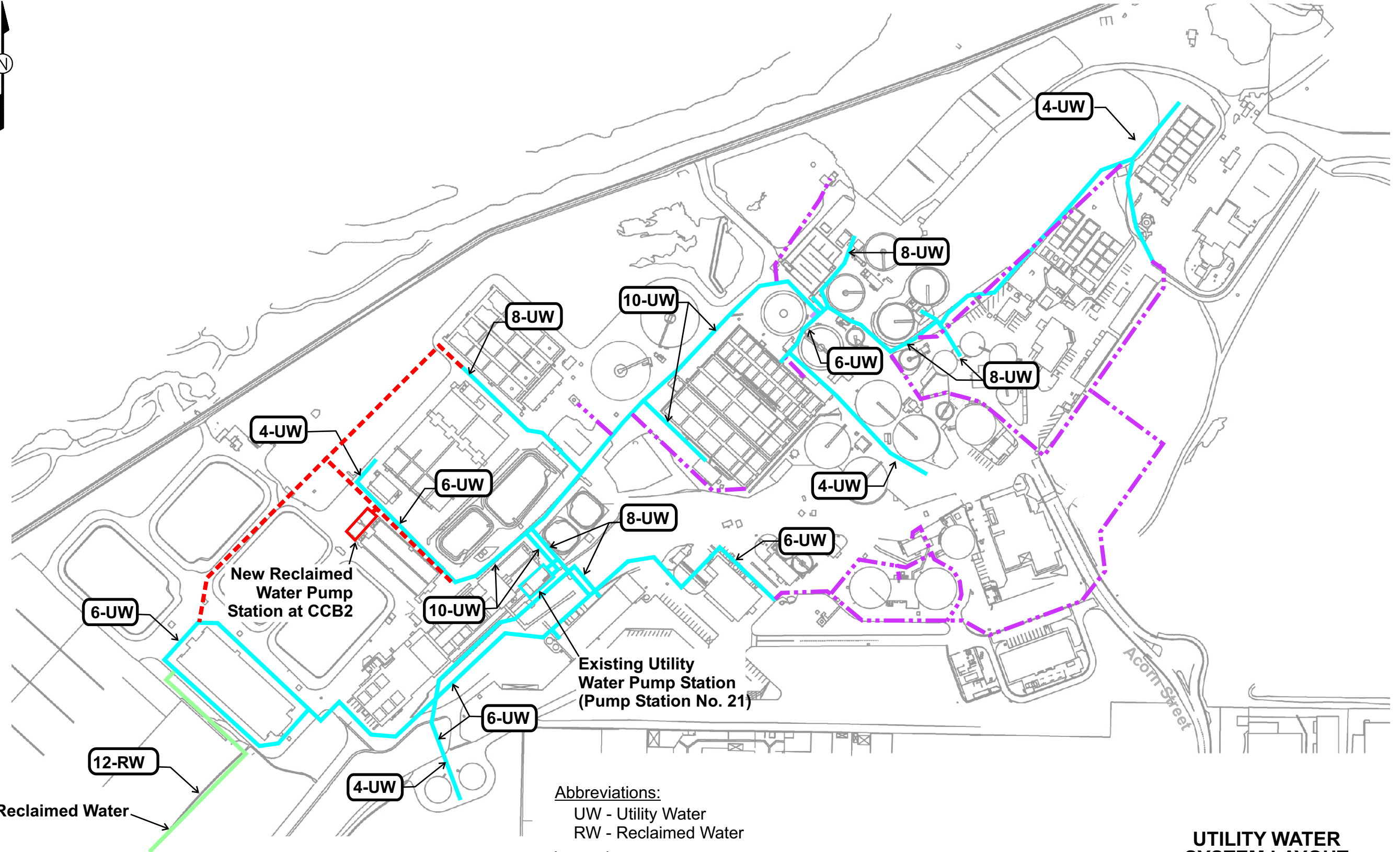


Abbreviation:  
PW - Potable Water

## POTABLE WATER SYSTEM LAYOUT

FIGURE 11.1





Abbreviations:

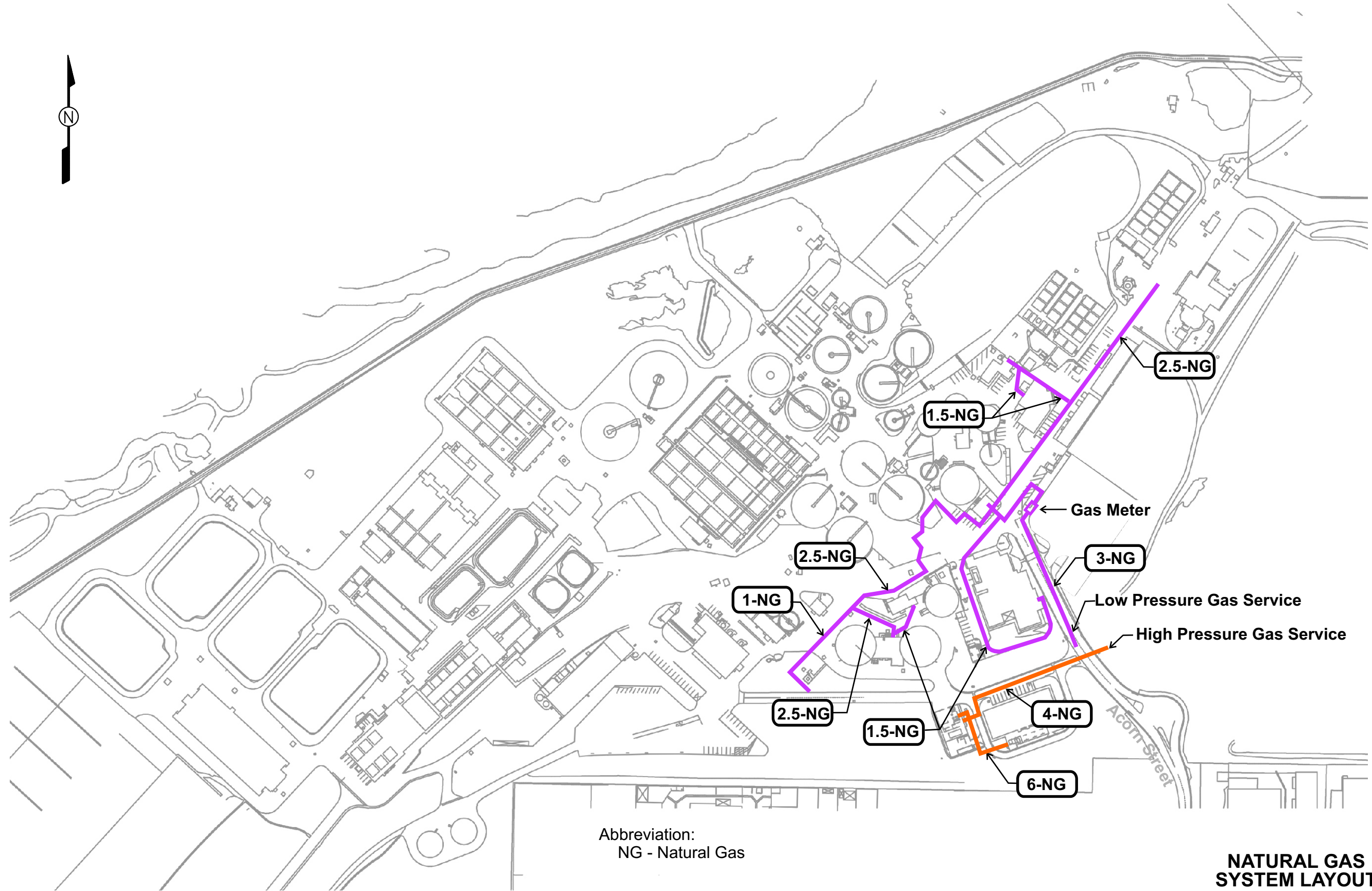
UW - Utility Water  
RW - Reclaimed Water

Legend:

- Existing Piping
- Piping Upgrades by PBS&J
- Piping Upgrades for New Reclaimed Water Pump Station

**UTILITY WATER  
SYSTEM LAYOUT**

FIGURE 11.2



Abbreviation:  
NG - Natural Gas

## NATURAL GAS SYSTEM LAYOUT

FIGURE 11.3



## **11.6 HIGH-PRESSURE AIR**

There is not a separate system to distribute HPA throughout the RWQCP. HPA systems are located in the following facilities for air tools and other uses:

- Headworks.
- Waste activated sludge thickening facility.
- Belt press dewatering facility.
- Tertiary filters.
- Cogeneration facility.

All of these systems are in good condition and provide adequate air for their intended purpose. New systems will be installed for new facilities as determined during preliminary design on a case-by-case basis.

## **11.7 COMMUNICATION SYSTEM**

The existing communication system consists of the following:

- Phone System: Plant phones, cell phones, and BlackBerry handheld devices. Plant phones provide both interplant uses and public uses. The cell phones use the Nextel network with direct paging and two-way walkie-talkie communication functions. The BlackBerry handheld devices provide wireless Internet access, and they are available to staff above the manager level.
- Plant Radio System: Motorola Icom repeater system. The plant radio system is in use every day and is used for two-way communication for those who do not have Nextel cell phones or Blackberry devices.
- Public Address (PA) System: The speaker system is activated from plant phone by dialing "75." Speakers are installed in the outside walkways and plant buildings, except for pump stations. The PA system is old and has a lot of background noise. At the project meeting on January 24, 2007, it was decided that the PA system would be upgraded.

## **11.8 SITE SECURITY**

Many major natural events, such as storms, fires, and earthquakes, which can be partially planned for, have been considered in the planning and design of the RWQCP. Since the events of September 11, 2001, malevolent acts by terrorists are also a concern.

Wastewater facilities are potential targets for malevolent acts of destruction and disruption from domestic and international terrorists. Purposeful contamination of wastewater, as well

as damage to treatment or conveyance systems, can lead to widespread and long-term environmental damage and severe public health impacts. The purpose of site security planning is to reduce the risks posed by malevolent threats. Based on *Interim Voluntary Security Guidance for Wastewater/Stormwater Utilities* published by the Water Environment Federation, the following security issues should be evaluated:

- Access Control: Currently, vehicular access to the site is not limited by a gate with a card key or other type of access control. However, an identification badge is required to be worn by all RWQCP staff. In addition, all visitors are expected to check in at the Administration Building upon entering the site. Additional identification for both staff and visitors may require a vehicular access control gate, card readers, Personal Identification Numbers (PIN), and/or biometrics. Access alarms for gates and doors and camera monitoring may also be considered. The site should also be evaluated for its illumination at night.
- Cyber Security: The reliance on the automated operation increases the vulnerability to cyber attack. Access to Supervisory Control and Data Acquisition (SCADA) needs to be evaluated for cyber security vulnerability assessment.
- Continuous Sampling and/or Monitoring: Flammable substances, such as gasoline and toxic chemicals, can disrupt the collection system or debilitate the biological system. Continuous sampling for these substances is highly recommended.
- Backup Power: Uninterruptible Power Supplies (UPSs) or some method of battery backup should be considered for emergency.

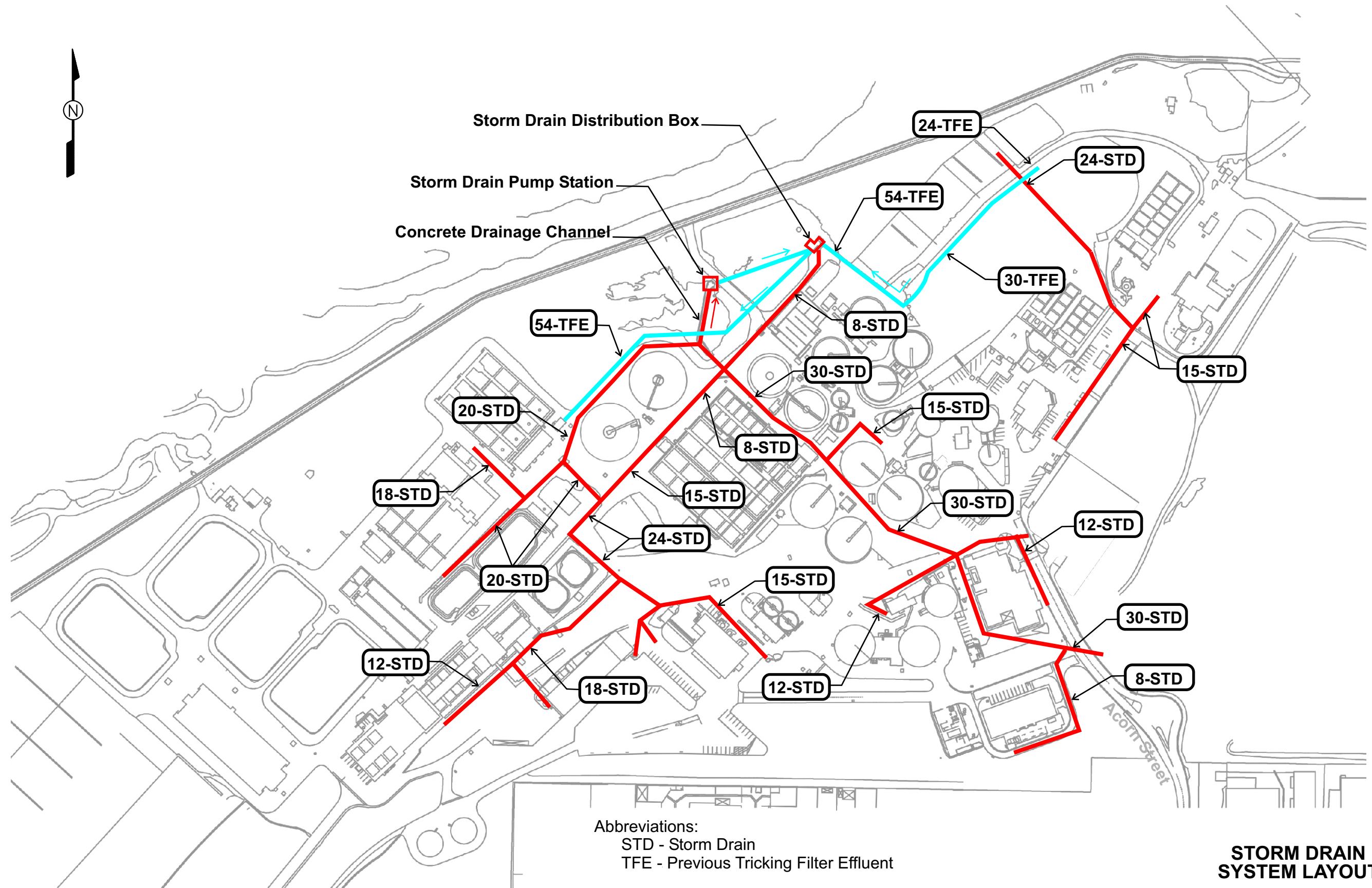
## 11.9 STORM DRAIN

Figure 11.4 shows the existing storm drain system. The stormwater is collected by a gravity system consisting of storm drains, open channels, and over-land flow. There are two main lines: a 24-inch pipe at the east and a 30-inch pipe at the center of the RWQCP. The 24-inch pipe is connected to the storm drain distribution box by the previous trickling Filter Effluent (TFE) pipes. The stormwater collected in the 30-inch drain flows through a concrete drainage channel and then the water is pumped through submersible pumps to the storm drain distribution box, where all the stormwater flows to the Plant 1 aeration basins through the 54-inch TFE pipe. This collection system is adequate, and new piping would be added to the existing system as necessary as future expansions are completed.

One improvement to the system would be to add an option to pump stormwater upstream of primaries. This will allow flows with large amounts of sediment from large storms to be captured in the primary clarifiers. It would also lessen the impact on the secondary treatment system.



Storm Drain Distribution Box  
Storm Drain Pump Station  
Concrete Drainage Channel



Abbreviations:  
STD - Storm Drain  
TFE - Previous Tricking Filter Effluent

## STORM DRAIN SYSTEM LAYOUT

FIGURE 11.4

## **11.10 SUPPORT FACILITIES**

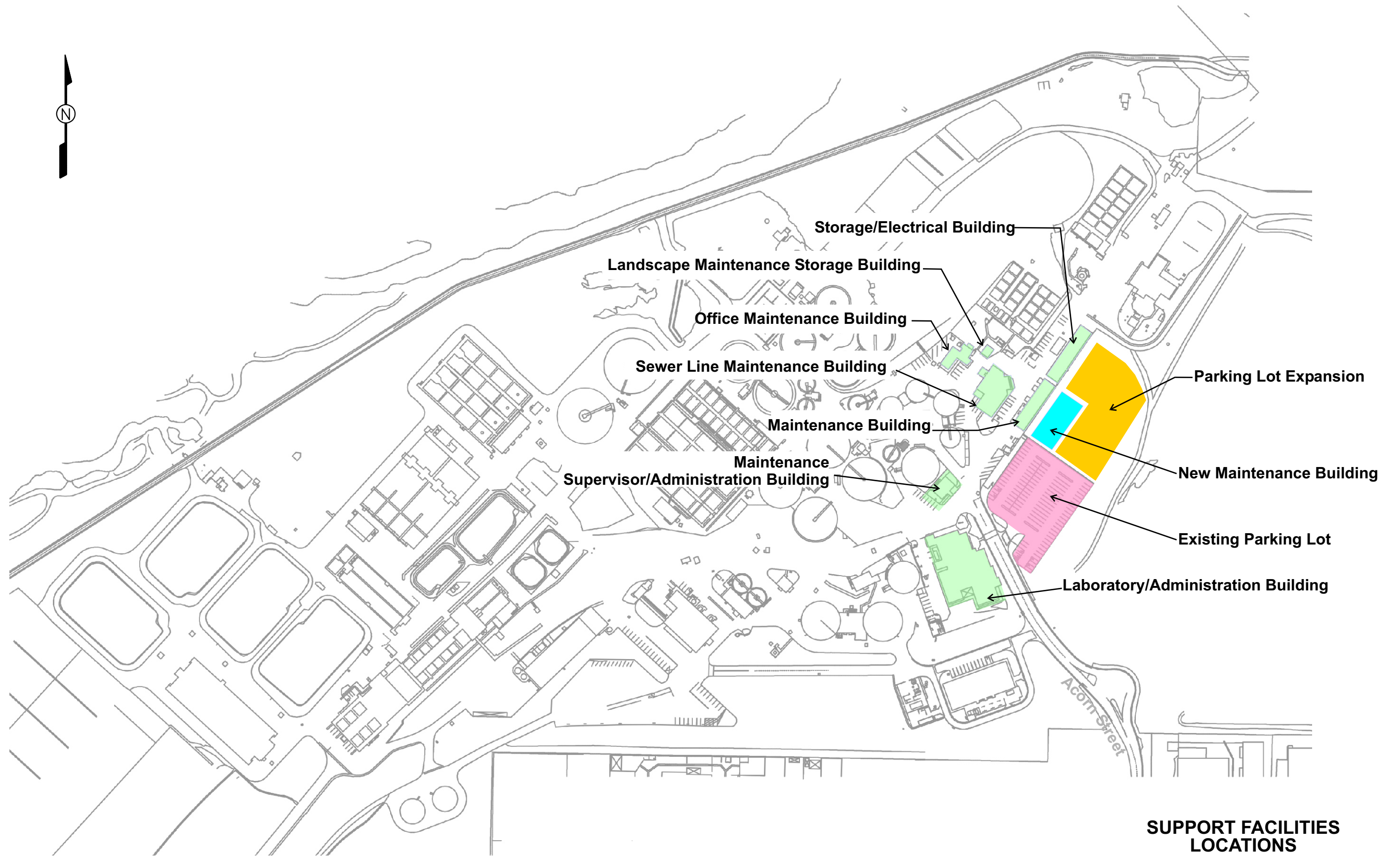
Figure 11.5 shows the locations of the existing and future RWQCP support facilities. A new maintenance building will be located south of the existing maintenance building. The new building will be 10,000 square feet. Additional parking space will be added east of the existing parking lot.

The new maintenance building will be in accordance with the City-approved “Green Municipal Building Policy.” This policy requires that new City buildings, in excess of 5,000 square feet, meet a minimum of the LEED standard.

## **11.11 FLOOD PROTECTION LEVEE**

Based on a preliminary analysis by the City, the existing levee that protects the RWQCP from the river may have to be raised. The City’s analysis assumes the potential new height of the levee is 8 feet higher than existing. Before the City decides that it is necessary to raise the levee, a more detailed analysis and hydrology study will be completed to confirm that the levee needs to be raised. In the meantime, a master plan level estimate of the construction cost of raising the levee has been completed. The construction cost of the levee project is estimated to be \$40 million, and the total project cost will be approximately \$52 million (August 2006 dollars). The schedule of the project is discussed in Volume 4, Chapter 14 – Implementation Schedule and Cost.





## SUPPORT FACILITIES LOCATIONS

FIGURE 11.5